

## **REMARKS**

Claims 1-32 are pending in the present application. Claims 5, 7, 8, 13, 21, 23, 24, and 29 have been amended.

Claims 7-13 and 23-39 are objected to for informalities. Specifically, in claims 7, 8, 23, and 24, the phrase “second snoop indications” should be “second snoop filter indications.” In addition, in claims 13 and 29 the term “entrees” should be “entries.” Applicant has amended the claims to correct the errors.

Claims 9, 10, 13, 25, 26, and 29 stand rejected under 35 U.S.C. §112, 2<sup>nd</sup> paragraph, as being indefinite. Specifically the Examiner asserts a lack of proper antecedent basis in claims 9, 13, 25, and 29 with respect to the differences between said storage and said second storage and later use of those phrases. Applicant respectfully traverses at least portions of this rejection and respectfully requests reconsideration of the claims in light of the following remarks.

Claims 1-5, 14, 17-21, and 30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Coulson (U.S. Patent Number 6,725,342) (hereinafter “Coulson”). Applicant respectfully traverses this rejection.

Claims 6-8, 11, 12, 15, 16, 22-24, 27, 28, 31, and 32 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. More particularly, claims 9, 10, 13, 25, 26, and 29 would be allowable if rewritten to overcome the rejections under 35 U.S.C. §112, 2<sup>nd</sup> paragraph, and claims 7-13, 16, 23-29, and 32 are allowable over the prior art of record as being dependent upon allowable base claims. Applicant has not, at this juncture, rewritten the claims into independent form since Applicant believes the independent claims to patentably distinguish over the cited reference as described below.

### **Rejection under 35 U.S.C. §112, 2<sup>nd</sup> paragraph**

The Examiner asserts that there is a lack of proper antecedent basis in claims 9, 13, 25, and 29. Specifically, the Examiner asserts it is not clear whether the phrases “said storage” and “said plurality of entries” refer to the first or second storage and the first or second plurality of entries, respectively.

Applicant respectfully submits there is proper antecedent basis. More particularly, there is a storage and a second storage, and each time they are referred to, they are referred to as such. Applicant believes it to be redundant to recite a first storage and a first plurality of entries since each time Applicant refers back to the second storage Applicant recites “second storage.” Thus, it is clear that when Applicant is referring to the storage recited in claim 1, the claim recites “said storage.” Similarly for the plurality of entries, when Applicant is referring back to the plurality of entries in the storage of claim 1, Applicant recites “plurality of entries of said storage.” Applicant has however amended claims 5 and 21 to include “second” plurality of entries when referring to the plurality of entries of the second storage. Accordingly, Applicant believes the claim language to be clear and definite.

Rejection under 35 U.S.C. §103(a)

Applicant’s claim 1 recites a mechanism for filtering snoop requests comprising in pertinent part:

“a cache controller configured to receive a transaction request including an address and to generate an index for accessing said storage by performing a hash function on said address;

wherein, said cache controller is further configured to selectively generate a snoop operation to said cache memory for said transaction request dependent upon a snoop filter indication stored in said storage that corresponds to said address.” (Emphasis added)

The Examiner asserts Coulson teaches the storage recited in Applicant’s claim 1 as the directory table of Coulson. Applicant respectfully disagrees with this analogy and

points the Examiner to Applicant's background section. The Examiner will note that Applicant specifically refers to computer systems using either directory-based protocols or snoop protocols and states "For example, coherency in multiprocessor shared-memory systems may be maintained through employment of either a directory-based protocol or a snooping protocol." and "However, the use of directories typically increases the system's latency (which is caused by the directory lookup), as well as the system's hardware complexity and cost." Accordingly, Applicant submits Coulson does not use a cache snoop protocol at all, and instead uses a directory protocol. Thus the directory table of Coulson is not the same as the storage for storing snoop filter indications. In addition, the Examiner asserts Coulson teaches generating an index to the directory table by performing a hash function on the address. Applicant disagrees with the Examiner's characterization of Coulson, and the Application of Coulson to Applicant's claims.

More particularly, Coulson mentions the word Hash one time in the entire specification. Specifically, Coulson discloses at col. 6, lines 31-45

"In another embodiment of the present invention, non-volatile cache 500 can include a cache directory table (i.e., cache directory) having a plurality of table entries. The cache directory can be accessed to determine whether a specific set of data of a mass storage device (e.g., a disk sector of a hard disk drive, a logical block of a hard disk drive, etc.) is present in the non-volatile cache 500. In an embodiment, the directory table can store an address (e.g., a logical sector address, a logic block address, etc.) of the data entry of the cache entry. To determine whether a specific set of data of a mass storage device is present in a non-volatile cache, the cache directory table can be searched using, for example, a known search algorithm. Alternatively, the cache directory can be sorted using a hashing algorithm." (Emphasis added)

From the foregoing, Applicant submits this teaching is clearly different than generating an index into a storage by hashing the address. Particularly since the directory table of Coulson stores addresses (e.g., tags). Thus Applicant submits Coulson **does not teach or suggest** "a cache controller configured to receive a transaction request including an address and to generate an index for accessing said storage by performing a hash function on said address," as recited in Applicant's claim 1. (Emphasis added)

In addition, since Coulson is storing address, not unlike a tag storage of some cache systems, there is no need to snoop the cache. The address lookup in the cache table is sufficient (although slow). Thus, if the lookup produces the desired address, then the data is retrieved from the cache. This is not the same as selectively generating a snoop to the cache based on whether there is an indication in the storage.

Further, the Examiner acknowledges Coulson does not use the address of the request in the hash function when determining whether or not the request data is in the cache. The Examiner asserts that it would have been obvious to do so. As described above, Applicant's storage does not store addresses, as Coulson does, and Applicant's hash of the address is the only way to index into the storage. Accordingly, Applicant fails to see how Coulson's teaching teaches or suggests the claimed limitation. Lastly, Applicant uses the hash of the address to index into the storage to decide whether to snoop the cache, not just whether the requested data is in the cash. Thus, Applicant submits Coulson **does not teach or suggest** "wherein, said cache controller is further configured to selectively generate a snoop operation to said cache memory for said transaction request dependent upon a snoop filter indication stored in said storage that corresponds to said address," as recited in Applicant's claim 1. (Emphasis added)

Thus, for the reasons given above, Applicant submits claim 1, along with its dependent claims, patentably distinguishes over Coulson.

Applicant's claim 17 recites features similar to the features recited in claim 1. Accordingly, Applicant submits claim 17, along with its dependent claims, patentably distinguishes over Coulson for at least the reasons given above.

**CONCLUSION**

Applicant submits the application is in condition for allowance, and an early notice to that effect is requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5181-95901/SJC.

Respectfully submitted,



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